"RI Reviews" file 151373

Pennsylvania Department of Environmental Protection

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May 24, 1996

Northwest Regional Office

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Copy received 5/29/96
by V. Janosik, RPM

Mr. Gordon Taylor, Senior Project Manager
Westinghouse Electric Corporation
1525 Westinghouse Building, Gateway Center
Pittsburgh, PA 15222

RE: Westinghouse Electric (Sharon Plant) Site March 20, 1996 Revised Remedial Investigation Report and April 5, 1996 Data Evaluation for Risk Assessment Report

Dear Mr. Taylor:

Representatives of the Pennsylvania Department of Environmental Protection ("Department") and the U.S. Environmental Protection Agency ("EPA") have completed their review of the March 20, 1996, revised Remedial Investigation Report ("RI") submitted for the Westinghouse Electric Corporation Sharon Transformer Plant Superfund Site. The March 20, 1996, RI report revision satisfactorily responded to the Department's January 11, 1996, request for revisions. The RI report is now considered as final.

Review has also been completed on the April 5, 1996, Data Evaluation for Risk Assessment Report ("Data Evaluation Report"). This interim document, which comprises the first portion of the Risk Assessment report, does not need to be revised and resubmitted as a stand alone document. Please incorporate the following comments into the Data Evaluation Section when preparing the draft Risk Assessment report:

1. General Commentary:

The Data Evaluation Report indicates that the May 1995 Conceptual Site Model ("CSM") shows the breakdown of exposure pathways by sector. However, there are some differences between the exposures identified in the Data Evaluation Report and those in the CSM and RI. For example, the A/B building area is now grouped with the south sector, the moat sector evaluation now appears to include exposure to subsurface soils, middle sector subsurface soil no longer are included for worker dermal contact and ingestion, and ARMCO property subsurface soils are no longer included for evaluation. This comment is being made only to point out that the report does not make it completely clear as to which pathways and receptors will be evaluated.

Results from the Department and EPA off-site soil sampling studies do

not indicate the Westinghouse Sharon Site has impacted the surficial soils in the vicinity surrounding the Site. Westinghouse had previously agreed to discuss this information qualitatively in the Risk Assessment, but the Data Evaluation report does not include any information accordingly.

Please note that several other issues have been deferred by Westinghouse to submittal of the draft Risk Assessment as noted in Appendix K of the RI report. They include, but are not limited to, the evaluation of pesticides, surface water, bedrock groundwater, and the evaluation of dioxins and furans in groundwater.

2. Section 2.1, River Sector (Sediment):

The Department does not concur with the elimination of Shenango River sediment samples SD-3A, 11A, 12A, and 13A from consideration in the Risk Assessment because "they are not indicative of sediments directly associated with possible site contributions" as indicated in the first paragraph. SD-13 was selected as the first depositional area below the low-head dam. Sediment samples SD-3A and SD-12A were collected at and immediately below the Pine Run confluence (Pine Run currently receives and historically received the drainage from the Wishart Court sewer interceptor, which receives the discharge from outfall 003). SD-11A was collected from the first depositional area below Pine Run. These sediment sampling locations are not "remote locations downriver of the site" as the text indicates. Additionally, because these areas historically received discharges from the Site; because PCBs (and other site related contaminants) were found at these locations during the RI and during previous site investigations; because the RI did not quantify or identify the "other sources of contamination" in these areas; and because liability is not a factor in determining what data should be used in the Risk Assessment; all statements concerning liability should be deleted and all pertinent data should be utilized when preparing the draft Risk Assessment.

3. Section 2.1, River Sector (Water):

Comment #2, above, also applies to the Shenango River water sampling locations that were eliminated from consideration in the Risk Assessment, including the Clark Street (SW-6) and Franklin Street (SW-8) outfalls. A preferable way to deal with the surface water would be to utilize the validated Department split samples to screen COPCs. The Department data covered more parameters, and a risk-based screening for parameters other than lead, oil, and grease would give a firmer basis for ruling out surface water exposure.

4. Section 2.1, River Sector (Fish):

Although it is difficult to assess fish contamination "directly" to the site, some correlation does exist. Please reference the enclosed Pennsylvania Fish and Boat Commission report titled *Analysis of Fish*

*Tissue Contaminants near the Westinghouse-Sharon Superfund Site*, dated December 15, 1995. This report may be of benefit for the qualitative discussion of the fish ingestion pathway (and to aid in eco-risk determination).

5. Section 2.2, North Sector:

Although the Department does not necessarily disagree with the approach in determining the risk posed in the North Sector, the blanket statement that there was "no significant documented use of chemicals in the North Sector" is incorrect and should be deleted. As documented in Westinghouse's Field Sampling Plan for the Site, "copper bright dip" and metal cleaning, cyanide plating, and painting operations were located in North Sector buildings. Wastes from these processes were collected in sumps and piped to the neutralization plant located in the Middle Sector. The discharge from the neutralization facility flowed to outfall 007, located within the Clark Steet storm sewer, which was monitored for various inorganic parameters. PCB handling areas were also present in the North Sector.

6. Section 2.3, Page 2-7:

Discussion of the LNAPL should refer to the Removal Action, so that this does not appear to be a critical data gap.

7. Section 2.3.1, page 2-8:

It is inappropriate to use two times the solubility limit for PCB concentrations in groundwater. Based on the reported levels of chlorobenzenes in the NAPL, it is likely that a cosolvency effect is occurring at this site which results in PCB levels in groundwater at concentrations greater than normal PCB solubility limits. A good way to handle the uncertainties in this situation is to evaluate more than one concentration to give a range of possible risk. The actual reported sample results can be used for the high end and the solubility limit for the PCBs can be used for a low end evaluation. Evaluation of the solubility and its effect on interpreting the risk assessment should be included in the uncertainty section.

8. Section 2.3.2, page 2-8:

Please clarify the technical reasoning supporting the decision to separate groundwater exposures between on-site and off-site and by sector. If the theoretical exposures are within the same aquifer, then risk should be assessed for the plume, regardless of whether the receptor is on-site or off-site, or in the North or South Sector. This issue is exemplified by the use of wells MW-15A, MW-15B, MW-16A, and MW-16B as both on-site wells and off-site wells for evaluation of Middle Sector groundwater.

9. Section 3.0, pages 3-2,3 and Figure 3-1:

MCLs are not an appropriate tool for screening COPCs for a Baseline Risk Assessment. This is reflected in the EPA regional guidance, which mentions ARARs exceedance as a tool to add COPCs to the list, and in RAGS, which generally discourages the use of ARARs in screening. RBCs are risk-based, but MCLs include other factors such as available technology and cost, and are designed for the regulation of public water supplies. The use of essential nutrient status in screening is appropriate. Please eliminate the use of MCL as a COPC screen, and adjust the COPC tables as necessary.

10. Page 3-3:

As noted in the EPA regional guidance, screening RBCs for noncarcinogens should be set at a Hazard Quotient of 0.1. This helps avoid ruling out chemicals whose additivity may result in target risk exceedances.

11. Page 4-1, last sentence:

Please note that the 95% UCL is based on the transformed arithmetic average.

12. Tables:

Table 2-1: Please explain why results for M-16 and Phase II results for M-1, M-2, M-7, and M-10 are being omitted from the groundwater evaluation.

Table 2-1 shows M-11B, M-9, and M-4B as alluvial wells, but the RI indicates that they are bedrock wells. Please clarify.

Tables 3-2, 3-3, and 3-4: The cyanide RBCs and units on these tables should be checked for accuracy. The dioxin TEFs in many cases do not match the TEFs presented in the RI; please clarify this.

Table 3-4: Please explain why TB-10 was excluded from the subsoil evaluation and why the Phase IB MW borings were not included.

Eco-Risk Assessment

Appendix K of the RI indicates that an Ecological Risk Assessment will be conducted for the site, however, the Data Evaluation for Risk Assessment does not address which data will be used for Eco-risk calculations (Comment numbers 2, 3, and 4 above on the River Sector have application to the data used for Eco-risk calculations.) Also, the Department has not received a Scope of Work and Work Plan for the Eco-risk Assessment. Additionally, please note that Section 7 ("Summary of Findings"), page 7-4, of the RI notes that media of interest will be evaluated for appropriate current and future pathways

and receptors. The listed pathways are, however, those principally evaluated for human health risk assessment and not for Eco-risk evaluation. Also, the list of receptors does not include any species or group of fish and wildlife. Contamination in the media of interest should be evaluated for potential risk to local habitats and especially for the Shenango River. This should include the pathways of transportation as well (e.g., storm water runoff, etc).

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If you will recall, the May 22, 1995 CSM cited in the Data Evaluation Report was never finalized or approved. Several of the comments above and in previous letters to Westinghouse relate to issues regarding the CSM. These issues need to be resolved prior to preparation of the draft Risk Assessment. In an effort to move this project forward as expeditiously as possible, I would like to schedule a meeting with Westinghouse either the first or second week of June to discuss these issues. I will be contacting you in the near future to schedule a date. A meeting agenda will be provided to Westinghouse before the meeting. Please be prepared to hammer out CSM issues (e.g., data groupings, exposure assumptions, etc.) since it is the Department's intent to leave the meeting with an agreed-upon CSM. I would also request that you prepare a response to the comments presented in this letter to clarify some of the data evaluation issues raised herein.

If you have any questions, please call me.

Sincerely,

Charles L. Tordella
Project Manager
Hazardous Sites Cleanup

Enclosure

cc: File
Ms. Stainbrook (w/o enclosure)
Mr. Leaver (w/o enclosure)
Mr. Turner
Mr. Janosik

# ANALYSIS OF FISH TISSUE CONTAMINANTS NEAR THE WESTINGHOUSE-SHARON SUPERFUND SITE

DECEMBER 15, 1995

Mark A. Hartle, Fisheries Biologist
Pennsylvania Fish and Boat Commission
Division of Environmental Services

# ANALYSIS OF FISH TISSUE CONTAMINANTS NEAR THE WESTINGHOUSE-SHARON SUPERFUND SITE

## Introduction

Pennsylvania Department of Environmental Protection fish tissue sample results were used to establish fish consumption advisories in effect on the Shenango and Beaver Rivers. Advisories were issued because of human health risks from consumption of Shenango River carp containing PCBs (≥2 ppm) and chlordane (≥0.3 ppm), and from consumption of Beaver River carp and channel catfish containing the same contaminants. High levels of PCBs have been found in river sediments (Cummings Riter Consultants, Inc. 1995).

The former Westinghouse Transformer Plant in Sharon used PCBs to fill certain types of transformers during manufacture from 1936 to 1976, when PCB use was discontinued. Cummings Riter Consultants, Inc. (1995) showed that groundwater and soil at the facility became contaminated with PCBs, other organic compounds, and metals. The possible contribution of contaminants of concern to the Shenango River by the Westinghouse-Sharon National Priorities List (Superfund) Site was evaluated through review of contaminant concentrations in fish tissue and sediment upstream, adjacent to, and downstream of the site.

Fish tissue results can indicate the presence of a human health or ecological risk, but a comprehensive risk assessment was beyond the scope of this investigation.

## Methods

Fish tissue samples taken by the Pennsylvania Department of Environmental Protection (formerly Department of Environmental Resources) and analyzed by the DEP Bureau of Laboratories were used as the database for this investigation. Data had been stored in the U.S. EPA STORET System and was retrieved on July 19, 1995. Samples spanned the time period 1979 - 1994.

Since the target area of this investigation was the vicinity of the former Westinghouse transformer plant in city of Sharon, samples from Shenango River, a tributary named Pine Run, and the Beaver River, into which the Shenango flows, were considered. Samples spanned a distance of 83 km (51.5 miles)(Figure 1).

Fish species sampled included common carp (Cyprinus carpio), largemouth bass (Micropterus salmoides), smallmouth bass (Micropterus dolomieui), sunfish (Lepomis spp.), suckers (Catostomus spp.), golden redhorse (Moxostoma erythrurum) and channel catfish (Ictalurus punctatus). Comparison of contaminant concentrations between different species would be misleading since the various species occupy different trophic levels, would have dissimilar modes of exposure, and may assimilate

contaminants at different rates. Comparison between different sample types, such as whole fish and fillet with skin, would not be valid because heterogeneous tissues usually contain disparate levels of contaminants. For example, PCB are lipophilic and are found in much higher levels in tissues with a high fat content (Laws 1993). To provide straight forward analysis, samples using carp fillets were compared. The carp is an effective indicator organism for this study for a number of reasons. It is an omnivore and effectively assimilates contaminants from both its environment and different food sources. It is exposed to sediment borne contaminants through its dietary preference for invertebrates from soft bottoms (Cooper 1983). Carp also indicate potential human health risks through consumption of their flesh. One Beaver River sample using channel catfish fillets was included in tissue comparison since a carp sample from the same date was not available. Cooper (1983) indicates that channel catfish are also omnivorous and occupy a trophic level similar to carp.

Data were screened for PCBs, metals, and chlordane. Contaminant concentrations upstream and downstream from the Superfund site were compared to determine if the site was contributing to levels of contaminants of interest in fish tissue.

## Results

### PCBs

The mean PCB concentration in Shenango River carp upstream from the Westinghouse-Sharon Site was 0.62 ppm (n=3, range 0.22-1.13 ppm). The mean PCB concentration downstream was 1.62 ppm (n=3, range 0-4.18 ppm). One of 3 upstream samples had a PCB concentration of 1.0 ppm or greater while 13 of 15 downstream carp fillets contained at least 1.0 ppm (Table 1 and Figure 1).

PCBs in whole sunfish from Pine Run were not compared to carp fillets, but the sample indicates a significant level PCBs was present in this Shenango River tributary, which appears to have received effluent from Westinghouse NPDES outfalls 001, 002, and 003 until the 1980s (Cummings Riter 1995).

Beaver River carp and channel catfish fillets had a mean PCB concentration of 0.85 ppm (n=5, range 0.61-1.90 ppm), which was lower than downstream Shenango River concentrations.

### Metals

Most Pennsylvania DEP fish tissue samples were not analyzed for metals. Limited analyses for lead, cadmium, chromium, and copper were performed. Table 1 summarizes results. Levels of all four metals at Site 2, upstream from the Westinghouse Site, were comparable to downstream Shenango River concentrations at sites 4, 8, 10, 12, and 13. Beaver River sites 14, 15, and 16 were similar to Shenango River results, with the exception of slightly elevated copper concentrations (Table 1).

Table 1. PCB, metals, and chlordane concentrations in carp fillets, including skin, unless otherwise noted.

| SITE | RIVER MILE | DATE | % FAT | PCBs | METALS | | | | CHLORDANE | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | mg/kg wet wt. | Pb mg/kg wet wt. | Cd mg/kg wet wt. | Cr mg/kg wet wt. | Cu mg/kg wet wt. | TOTAL mg/kg wet wt. | TECH. mg/kg wet wt. |
| Shenango Reservoir | | | | | | | | | | |
| 1 | 33.8 | 08/01/88 | 1.15 | 0.22 | | | | | <.050 | |
| Shenango River | | | | | | | | | | |
| 2 | 32.3 | 08/10/92 | 9.00 | 1.13 | 0.025 | 0.006 | 0.044 | 0.837 | | <.020 |
| | | 06/02/88 | 3.16 | 0.51 | | | | | .110 | |
| 3 | 28.2 | 06/01/88 | 2.43 | 1.50 | | | | | .530 | |
| 4 | 28.0 | 09/14/92 | 6.00 | 4.18 | 0.026 | 0.004 | 0.069 | 0.614 | | <.020 |
| 6 | 27.8 | 06/01/88 | 2.98 | 1.70 | | | | | .470 | |
| | | 04/21/82 | | 1.40 | | | | | .220 | |
| 7 | 27.0 | 08/10/88 | 2.60 | 2.50 | | | | | .600 | |
| 8 | 25.1 | 09/15/92 | 6.00 | <.250 | 0.023 | 0.002 | 0.056 | 0.686 | | <.020 |
| | | 07/28/88 | 2.60 | 1.30 | | | | | .460 | |
| 9 | 23.9 | 08/03/88 | 4.61 | 1.29 | | | | | .360 | |
| 10 | 15.5 | 09/17/92 | 3.00 | 1.85 | 0.032 | 0.005 | 0.043 | 0.779 | | .076 |
| | | 07/29/88 | 2.60 | 0.66 | | | | | .270 | |
| 11 | 5.1 | 08/02/88 | 5.88 | 1.30 | | | | | .430 | |
| 12 | | 09/16/92 | 3.00 | 1.54 | 0.010 | 0.003 | 0.045 | 0.372 | | <.020 |
| 13 | 0.9 | 09/16/92 | 6.00 | 1.48 | 0.058 | 0.007 | 0.027 | 1.018 | | .046 |
| | | 10/12/89 | 4.65 | 1.00 | | | | | | .027 |
| | | 11/30/88 | 6.89 | 2.60 | | | | | .047 | |
| Pine Run | | | | | | | | | | |
| 5 | TRIB | 05/10/79 | | 7.10[1] | | | | | | |
| Beaver River | | | | | | | | | | |
| 14 | | 09/01/88 | 5.98 | 0.64 | 0.066 | 0.013 | 0.082 | 0.717 | <.050 | |
| 15 | | 10/17/91 | 5.00 | 1.17[2] | 0.118 | 0.002 | 0.053 | 1.548 | | .060[2] |
| | | 08/02/89 | 3.83 | 0.92 | 0.063 | 0.008 | 0.037 | 0.504 | | .167 |
| 16 | 3.7 | 09/22/94 | 9.70 | 0.61 | 0.129 | 0.007 | 0.186 | 1.420 | | .176 |
| | | 07/22/85 | | 0.89 | | | | | .300 | |

[1]Sunfish - whole fish
[2]Channel catfish - filet

Chlordane

Concentrations of chlordane in excess of the 0.3 ppm FDA action level were found in some carp and channel catfish samples from the Shenango and Beaver Rivers both upstream and downstream from the Westinghouse plant (Table 1 and Figure 1). Chlordane was not identified in analyses of Westinghouse site soil and water (Cummings Riter 1995).

## Discussion

PCBs

PCBs in carp were found at higher levels downstream than upstream from the Westinghouse site. Associating higher fish tissue PCB concentrations with the Westinghouse site becomes more logical when fish tissue results (Figure 1) are coupled with Cummings Riter (1995) sediment sample results summarized in Table 2. Samples results and locations of Cummings Riter (1995) showed that pathways exist to transport contaminants from the Superfund site, particularly sewers carrying NPDES regulated effluents. The Clark Street outfall is located west of the Westinghouse site and has historically received effluent from Westinghouse. PCB sediment concentrations upstream did not exceed 1 ppm. From the Clark Street outfall downstream to the dam at the Shenango Valley Water Company Plant, sediments contained approximately ten times the PCB concentrations found upstream. This area is denoted in gray shading in Table 2. A significant reservoir of PCBs exists in sediment between Clark Street and the dam. Fish tissue samples were not been taken in this area.

Sediment concentrations of PCBs in excess of 10 ppm from Clark Street to the dam (SD-1 to SD-14 in Table 2) make it similar to the PCB contaminated depositional areas identified for swift remedial action by the Record of Decision (ROD) for the Paoli Railyard Superfund Site (U.S. EPA 1992). The Paoli ROD selected a stream bank and sediment cleanup standard of 1 ppm to "reduce aquatic toxicity and bioconcentration of PCBs". Field observation at the site on November 16, 1995 showed a concentration of carp at the Clark Street outfall and in backeddy areas downriver. Areas preferred by carp corresponded very well with low current velocity areas ideal for sediment deposition.

PCB fish tissue concentrations in Shenango River carp were plotted against distance in kilometers from the Westinghouse plant in Figure 2, in an attempt to define to zone of influence of site related PCB contamination. Figure 2 shows a slope that cannot be said to differ from zero. A drop in carp fillet PCB concentrations is therefore not evident. Elevated PCBs in carp occur from the Westinghouse-Sharon Site over 45 kilometers to the mouth of the Shenango River.

Since PCBs are lipophilic, PCB concentrations were plotted against carp fillet fat content. Results in Figure 3 show a very weak positive relationship. An $R^2$ value of 0.148 indicates that only 14.8% of the variance of PCB concentration (Y) can be

Table 2. Summary of Westinghouse-Sharon NPL Site Remedial Investigation sediment samples (compiled from Cummings Riter 1995, Figure 4-11)

| LOCATION (approximate) | SEDIMENT SAMPLE # | PCB CONC. ppm |
|---|---|---|
| 4000' upstream from Clark St. Outfall | SD-17A,B | .015-.086 |
| 150' upstream from Clark St. Outfall | SD-16 | .240 |
| Clark Street Outfall | SD-1 | 8.4-25.0 |
| 150' downstream from Clark St. Outfall | SD-15 | 7.5-19.4 |
| Former N. Hotwell Outfall (650'downstr.) | SD-4 | .82-.94 |
| Above dam, 1450' downstr. from Clark St. | SD-14 | 3.5-11.0 |
| Franklin St. Sewer Outfall (2450' dnstr) | SD-2 | .11-.22 |
| Silver St., 4500' downstr. from Clark St | SD-13 | 1.16 |
| U.S. Rt. 62, 6000' downstream | SD-3 | .087-.140 |
| 6400' downstream from Clark St. Outfall | SD-12 | 2.81 |
| Near Budd St., 7700' downstream | SD-11 | .34-.48 |

Figure 2. PCB concentrations in Shenango River carp fillets vs. distance downstream from Westinghouse-Sharon plant

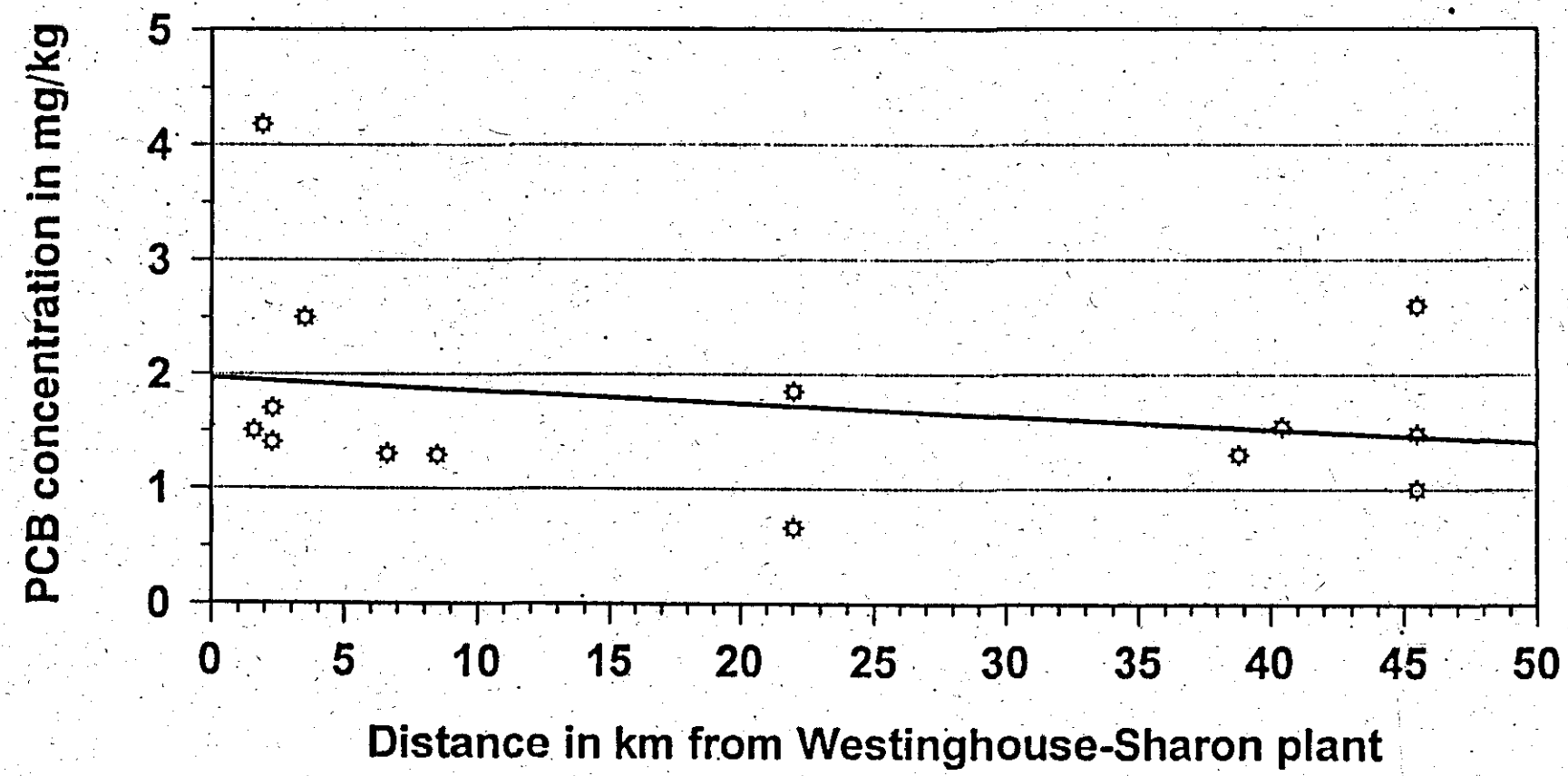
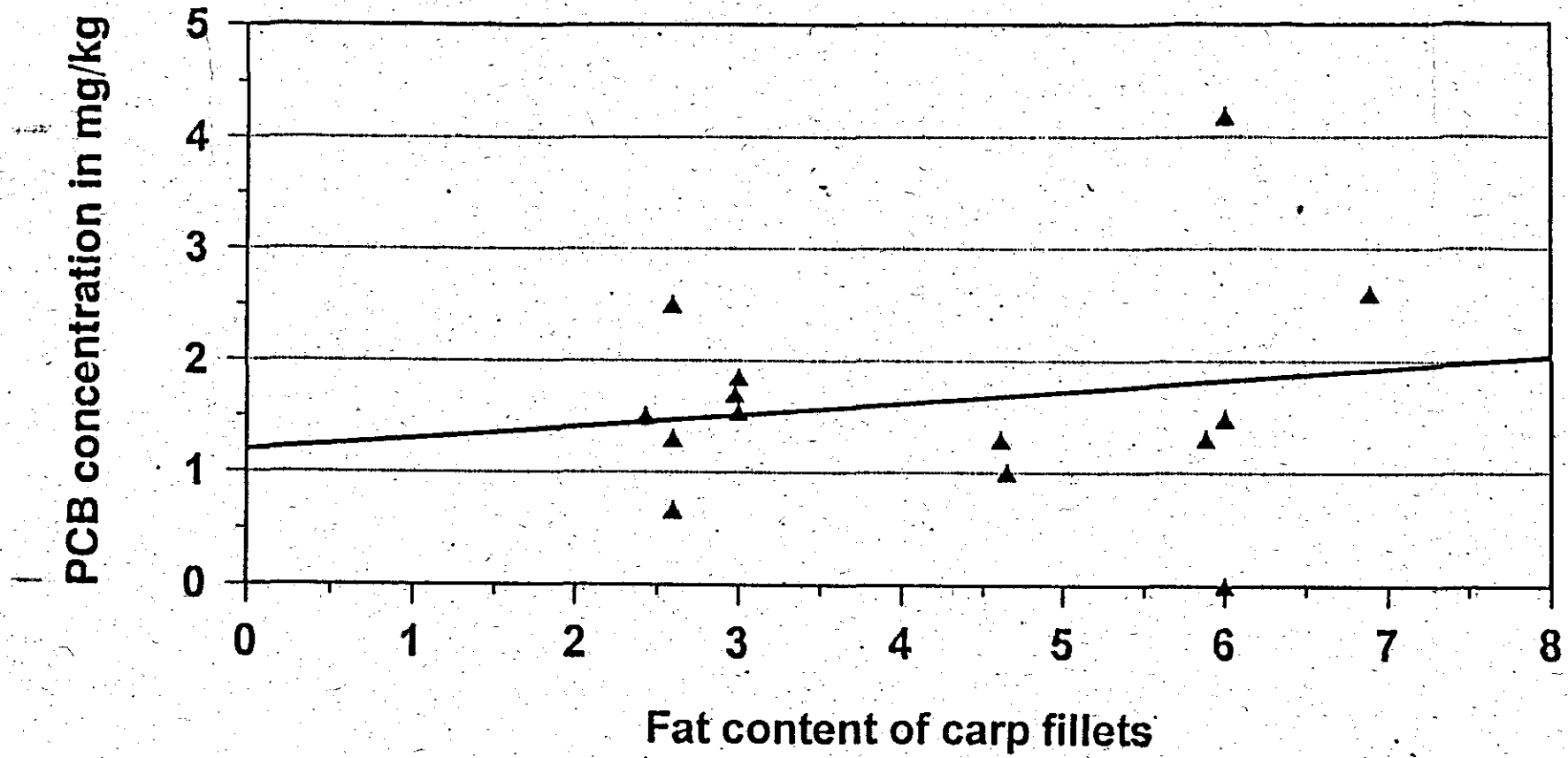


Figure 3. PCB concentrations vs. fat content in Shenango River carp

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attributed to its linear regression on fat content (X). Since no gradient of fat content from upstream to downstream exists in this study (Table 1 and Figure 1), this variable was disregarded in analysis of results.

Eisler (1986) reported that whole body PCB residues of 0.4 ppm affected reproduction of some sensitive fish. Egg viability was reduced in some cases when eggs contained 0.3 ppm PCBs. Based on carp fillet PCB concentrations, is probable that whole body egg burdens of PCBs have reached these levels in Shenango River fish. Eisler (1986) also indicated that PCBs can inhibit photosynthesis and growth in algae at very low concentrations (0.1 ppb in water).

Metals

No difference in concentrations of lead, cadmium, chromium, and copper could be discerned in carp sampled upstream and downstream from Westinghouse. Elevated lead levels were associated with Westinghouse site soil and some sediment samples by Cummings Riter (1995). Anaylses for metals other than lead were not performed for sediment samples. One surface water sample at the SD-16 location contained 25.4 ug/l lead, which exceeds the Ambient Water Quality Criteria. This influence of the Westinghouse site on this water sample is questionable. The absence of fish tissue samples from the Shenango River immediately adjacent to the Westinghouse site makes judgement of very localized impacts from metals impossible.

The only metal of the four evaluated with an established FDA action level for human consumption of fish tissue is cadmium at 0.3 ppm. Cadmium levels in carp were far less than 0.3 ppm.

Chlordane

Cummings Riter (1995) did not find chlordane in Westinghouse-Sharon Superfund Site analyses. Chlordane was present in carp downstream from Sharon at levels exceeding the 0.3 ppm FDA action level. Further consideration was not given to chlordane since is did not appear to be a site related contaminant.

## Conclusion

Shenango River carp contain higher levels of PCBs in the area influenced by the Westinghouse-Sharon Superfund Site. Sediment samples in excess of 10 ppm PCBs identify the area between Clark Street and the dam at the Shenango Valley Water as an area requiring immediate attention. The zone of significant Westinghouse site PCB influence on fish extends to the nmouth of the Shenango River, over 45 kilometers downstream. The zone of significant site related PCB influence on sediments has not been defined. This is evidenced by sediment concentrations greater than 1 ppm near the downstream limit of sampling below the dam and fish flesh in excess of the FDA action level for PCBs over 45 km downstream.

No difference in levels of lead, cadmium, chromium, and copper were found in carp taken upstream and downstream from the Westinghouse-Sharon site. The possibility of very localized biological effects of site related metals near current and former outfall areas is unknown due to the absence of samples in this area.

Chlordane concentrations in fish were higher from Sharon downstream, but this was not attributed to the Westinghouse-Sharon Site.

Completion of an environmental and human health risk assessment report is recognized as necessary in the Westinghouse-Sharon Superfund Site Administrative Record. Fish tissue samples indicate that both human health and environmental risks to fish are not only possible, but are actually present. In addition to these documented risks, a site risk assessment should include assessment of:

1. The geographic extent of the documented risks.
2. The potential of bioaccumulation.
3. Risk to primary producers and invertebrates.
4. Localized risks near Shenango River outfalls.
5. Risks from continued transport of site related contaminants.

## REFERENCES


Cooper, E. L. 1983. Fishes of Pennsylvania and the northeastern United States. Pennsylvania State Univ. Press, University Park, PA. 243p.

Cummings Riter Consultants, Inc. 1995. Remedial investigation report: Westinghouse Electric (Sharon Plant), Sharon, Pennsylvania. Project No. 93111.20-13. Monroeville, PA. 4 volumes.

Eisler. R. 1986. Polychlorinated biphenyl hazards to fish, wildlife, and invertebrates: a synoptic review. U. S. Fish and Wildlife Serv. Biol. Rep. 85(1.7). 72p.

Laws, E. A. Aquatic pollution: an introductory text. John Wiley & Sons, Inc., New York. 611p.

U. S. Environmental Protection Agency. 1992. Record of Decision: Paoli Railyard Superfund Site, Paoli, Chester County, Pennsylvania. U.S. EPA Region III, Philadelphia. 26p.


FIGURE 1.

## Fish Tissue Samples ... the Westinghouse-Sharon NPL Site

PCB conc. in carp fillets including skin unless otherwise noted.
FDA action level for fish consumption advisory is 2 ppm PCBs.

| SITE | RIVER MILE | DATE | % FAT | TOTAL PCBs (mg/kg) |
|---|---|---|---|---|
| Shenango Reservoir | | | | |
| 1 | 33.8 | 08/01/88 | 1.15 | 0.22 |
| Shenango River | | | | |
| 2 | 32.3 | 08/10/92 | 9.00 | 1.13 |
| | | 08/02/88 | 3.16 | 0.51 |
| NPL Site | 29.2 28.3 | Westinghouse-Sharon Plant limits | | |
| 3 | 28.2 | 08/01/88 | 2.43 | 1.50 |
| 4 | 28.0 | 09/14/92 | 8.00 | 4.18 |
| 6 | 27.8 | 08/01/88 | 2.98 | 1.70 |
| | | 04/21/82 | | 1.40 |
| 7 | 27.0 | 08/10/88 | 2.60 | 2.50 |
| 8 | 25.1 | 09/15/92 | 6.00 | <.250 |
| | | 07/28/88 | 2.60 | 1.30 |
| 9 | 23.9 | 08/03/88 | 4.61 | 1.29 |
| 10 | 15.5 | 09/17/92 | 3.00 | 1.85 |
| | | 07/29/88 | 2.60 | 0.66 |
| 11 | 5.1 | 08/02/88 | 5.88 | 1.30 |
| 12 | 4.1 | 09/16/92 | 3.00 | 1.54 |
| 13 | 0.9 | 09/16/92 | 6.00 | 1.48 |
| | | 10/12/89 | 4.65 | 1.00 |
| | | 11/30/88 | 6.89 | 2.60 |
| Pine Run (trib. to Shenango River at RM 27.86) | | | | |
| 5 | 0.2 | 05/10/79 | | 7.10[1] |
| Beaver River (Shenango R. enters at RM 21.42) | | | | |
| 14 | 15.1 | 09/01/88 | 5.98 | 0.64 |
| 15 | 5.4 | 10/17/91 | 5.00 | 1.17[2] |
| | | 08/02/89 | 3.83 | 0.92 |
| | | 08/24/82 | | 1.90[2] |
| 16 | 3.7 | 09/22/94 | 9.70 | 0.61 |
| | | 07/22/85 | | 0.89 |

[1]sunfish - whole fish
[2]channel catfish - fillet
[2]carp - whole fish